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Teaching Science in an Inclusive Way

"Educating Rhode Island's children is what our schools are all about. This education process must focus on the strengths of our children, recognizing them and building upon them. It must be founded upon high expectations for children as well as for parents, teachers, and the community. We must let them know that we believe that all of them can reach high levels of performance with the appropriate instruction and support."

... Reaching for High Standards: Student Performance in Rhode Island, RIDE, December 1993.

What direction does Rhode Island plan to pursue toward creating a more positive learning environment for its children in the science classrooms? How does one begin to deal with the socioeconomic, racial/ethnic, linguistic, gender, 'gifted', and disability differences present in the Rhode Island classrooms? We must plan appropriate strategies to make science relevant, exciting, and challenging for all children.

Setting and maintaining high expectations for all students is a critical aspect of inclusive education. All students are expected to continuously progress through the goals in the state's Common Core of Learning and in specific subject matter areas, such as science. To ensure maximum growth and performance, students with diverse learning needs may require a variety of accommodations in the curriculum, in instructional practices and in pace and style of learning. School staff, family members and the student should work together to plan the student's goals in relation to the framework and the accommodations needed to support success. If the student has a Section 504 plan or Individualized Education Program (IEP), appropriate goals for science and other curriculum and skill areas should be incorporated into it. Supports, services and curricular and instructional accommodations will also be included. Observations of performance on at least a quarterly basis will demonstrate the student's learning progress and suggest areas of adjustment in the student's plan.

How can we use science education effectively to engage more students in science, technology, and career-related pursuits? Research reports validate that making connections is a prerequisite to inviting members of all underrepresented groups to science (AAUW, 1992). Demonstrating the connections between science, technology, and their life experiences is extremely enhancing for the development of all science students. These connections are part of the fabric of what has been called STS (Science, Technology & Society) education and offers teachers the possibility for changing the way many students have

traditionally viewed science. STS education enables students to address scientific and technological issues that directly concern their lives while providing them with the skills and understandings they need to think through complex issues (Solomon and Aikenhead, 1994).

All students must be actively engaged in classroom conversations and all students should be exposed to scientists from diverse genders, socio-cultural groups, and the disabled population.

It is recommended that inclusive science education become a reality and concern for all teachers. Inclusive education incorporates the idea that all students - regardless of their gender and social class, their ethnic or cultural characteristics, and their disabilities or learning differences - should have an equal opportunity to learn. The basic premises of inclusive science education incorporate the following:

1. All students can learn science;
2. Every student can make a positive contribution in the science classroom; and
3. Diversity is appreciated in science classrooms because it enhances rather than detracts from the richness and effectiveness of science learning.

In *Tomorrow's Teachers: A Report of the Holmes Group*, several educational goals were identified to help science teachers strive toward meeting the needs of an increasingly diverse population:

1. Acquire knowledge and skills that social scientists and practitioners have applied to the study of children's learning;
2. Present appropriate lessons for particular students and use indirect, but powerful, teaching strategies such as role playing and collaboration to increase teachers' instructional effectiveness with diverse groups of at-risk students;
3. Eliminate school and teacher stereotypes and expectations that can narrow student opportunities for learning and displaying competence; and
4. Create and sustain a communal setting respectful of individual differences and group membership, where learning is valued, engagement is nurtured, and interest is encouraged.

Special training should be provided for all teachers in order to improve the academic achievement of students who have historically been underachievers. A variety of effective intervention programs exist for nurturing minorities for careers in science, engineering, and mathematics. Gender/Ethnic Expectations and Student Achievement (GESA) has proven to be one successful training program. The GESA program,

"A critical implication of the Regents policy is that student performance differences should not be connected to race, ethnicity, gender, poverty, community of residence or any other attributes that have historically separated students in their opportunity to succeed and in their full participation in American life."

... Reaching for High Standards: Student Performance in Rhode Island, RIDE, December 1993.

"We must make education more personal, encourage teachers to collaborate more freely, and involve parents and social service organizations more directly in schools."

... Rhode Island's Choice: High Skills or Low Wages, RI Skills Commission, May 1992.

The SCANS competencies include:

Information - acquire, evaluate, organize and maintain data; interpret and communicate information.
Interpersonal Skills - work in teams; teach and serve others; lead, negotiate and work with people from culturally diverse groups.
Resources - allocate time, money, materials, space and human resources.
Systems - understand and operate within social, political and organizational systems; monitor and correct performance of systems.
Technology - select and apply tools and technologies appropriate to specific tasks, including the use of computers and technologies to process information."

... Rhode Island's Choice: High Skills or Low Wages, RI Skills Commission

commencing in 1977, was among the first to attempt to apply solutions across parallel equity issues. GESA addresses five specific areas of disparity:

1. Instructional contact;
2. Grouping and organization;
3. Classroom management;
4. Enhancing self-esteem; and
5. Evaluation of student performance.

For further information on GESA programs in Rhode Island, please contact Carol Englander at the South Kingstown School Department, telephone 792-9681.

Another effective program is MESA (Mathematics, Engineering, Science Achievement) formed in 1970. The MESA program presently works in 49 sites throughout California and has markedly increased minority enrollment and academic success in California colleges and universities. Special out-of-school enrichment opportunities, mentoring, workplace site internships, and career counseling are important components of the program. Key strategies from this program have been used to launch other successful programs throughout the country (Somerton, Smith, Finnel and Fuller, 1994).

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